

MODULE V
CORRECTIVE ACTION FOR SOLID WASTE MANAGEMENT UNITS
SCHEDULE OF COMPLIANCE

V.A. SOLID WASTE MANAGEMENT UNITS

- V.A.1. The Permittee shall conduct corrective action in accordance with the permit conditions specified in Module V of the permit, for each Solid Waste Management Unit specified in Tables 1 and 2.
- V.A.2. The Executive Secretary may append additional Solid Waste Management Units to those listed in Tables 1 and 2, in accordance with R315.3.4.3, based on additional information received by the Permittee, the Executive Secretary, the Administrator, or any other knowledgeable source.

V.B. STANDARD CONDITIONS

- V.B.1. Failure to submit the information required by the Conditions within Module V or falsification of any submitted information is grounds for termination in accordance with R315-3-4-4.
- V.B.2. All plans, reports, notifications, and other submissions to the Executive Secretary, as required by the Conditions within Module V shall be signed and certified in accordance with Condition I.CC.
- V.B.3. The Permittee shall submit one (1) paper copy and one (1) electronic copy of each plan, report, notification, or other submissions, required by the Conditions within Module V, to the Executive Secretary by mail or hand delivery to the address specified in Condition I.FF.
- V.B.4. All plans and schedules, as required by the Conditions in Module V, upon written approval from the Executive Secretary, shall be incorporated into Module V in accordance with Condition V.I. Any noncompliance with such approved plans and schedules shall be deemed noncompliance with this permit.
- V.B.5. The Permittee shall only receive extension(s) of the specified compliance schedule due date(s) for the submittal(s) required by the Conditions within Module V, upon written approval from the Executive Secretary in accordance with Condition V.I.
- V.B.6. All raw data, such as laboratory reports, drilling logs, bench-scale or pilot-scale data, and other supporting information gathered or generated during activities undertaken pursuant to the Conditions in Module V shall be maintained at the Facility during the effective term of this permit.

V.C. RCRA FACILITY INVESTIGATION

- V.C.1. The Permittee shall conduct a RCRA Facility Investigation to determine the nature and extent of known and suspected releases of hazardous wastes and/or hazardous waste constituent(s) from each Solid Waste Management Unit at the Facility and to gather data to support the Corrective Measures Study. The Permittee shall conduct the RCRA Facility Investigation in accordance with the requirements specified in Appendix A.
- V.C.2. The Permittee shall prepare and submit the RCRA Facility Investigation, Task I Report, as specified in Appendix A for each Solid Waste Management Unit in which a release of hazardous waste or hazardous waste constituent(s) has not been documented.
- V.C.3. The Permittee shall conduct a RCRA Facility Investigation-Phase I, in accordance with Appendix A, Task I, D, for each Solid Waste Management Unit in which a release of hazardous waste or hazardous waste constituent(s) has been documented, as specified in Table 1.
- V.C.4. The Permittee shall evaluate the RCRA Facility Investigation-Phase I Report and identify Solid Waste Management Units that require additional investigation under the RCRA Facility Investigation Phase II (Task II and Task III).
- V.C.5. Based on the data collected in the RCRA Facility Investigation-Phase I, the Permittee shall prioritize each Solid Waste Management Unit, identified for additional investigation pursuant to Condition V.C.4., according to the Solid Waste Management Unit's potential or imminent threat to human health or the environment.
- V.C.6. Based on the classification of the Solid Waste Management Unit(s), pursuant to Condition V.C.5., the Permittee shall identify a need, if applicable, and recommend an alternate RCRA Facility Investigation schedule(s) for the additional investigation of any Solid Waste Management Units' potential or imminent threat to human health or the environment.
- V.C.7. The Permittee may modify the RCRA Facility Investigation schedules, specified in Table 3 and 4, pursuant to Conditions V.I.1. and V.I.3., to allow additional investigations under the RCRA Facility Investigation-Phase II (Task II and Task III) to be conducted according to the prioritization of the Solid Waste Management Units, in accordance with Conditions V.C.5. and V.C.6.
- V.C.8. The Permittee shall prepare and submit the results of the RCRA Facility Investigation-Phase I in the Task I Report.
- V.C.9. The Permittee shall conduct the RCRA Facility Investigation for the Solid Waste Management Units specified in Table 1 in accordance with the schedule specified in Table 3.
- V.C.10. The Permittee shall conduct a RCRA Facility Investigation (Task II and III), excluding the RCRA Facility Investigation-Phase I (Task I) requirements, as specified in Appendix A, for each Solid Waste Management Unit, specified in Table 2, in which a release of hazardous waste or hazardous waste constituent(s) have been documented. The RCRA Facility Investigation shall be conducted concurrently with the RCRA Facility Investigation specified in Condition V.C.2.

- V.C.11. The Permittee shall conduct the RCRA Facility Investigation for the Solid Waste Management Units specified in Table 2 in accordance with the schedule specified in Table 4.
- V.C.12. The RCRA Facility Investigation compliance schedules, specified in Tables 3 and 4, shall be modified in accordance with Condition V.I.

V.D. INTERIM MEASURES

- V.D.1. If during the course of any activity initiated in compliance with the Conditions of Module V, the Executive Secretary or the Permittee determines that a release or potential release of hazardous waste and/or hazardous waste constituent(s) from a Solid Waste Management Unit poses a threat to human health and the environment, the Executive Secretary may require the Permittee to perform specific interim measures.
- V.D.2. The Executive Secretary will notify the Deseret Chemical Depot of any interim measures that may be required. If interim measures are required the Permittee shall develop and submit an Interim Measures Plan to the Executive Secretary for approval.
- V.D.3. The Interim Measures Plan shall identify specific actions(s) to be taken to implement the interim measures and a schedule for implementing the required measures. At a minimum, the Interim Measures Plan shall consider, but not be limited to, the following factors:
- V.D.3.i Time required developing and implementing a final remedy;
 - V.D.3.ii Actual and potential exposure of human and environmental receptors;
 - V.D.3.iii Actual and potential contamination of drinking water supplies and sensitive ecosystems;
 - V.D.3.iv The potential for further degradation of the medium absent of interim measures;
 - V.D.3.v Presence of hazardous waste in containers that may pose a threat of release;
 - V.D.3.vi Presence and concentration of hazardous waste including hazardous waste constituent(s) in soils has the potential to migrate to groundwater or surface water.
 - V.D.3.vii Weather conditions that may affect the current levels of contamination;
 - V.D.3.viii Risks of fire, explosion, or accident; and
 - V.D.3.ix Other situations that may pose threats to human health and the environment.
- V.D.4. The Executive Secretary will notify the Permittee in writing of the requirement to perform the interim measures specified in the Interim Measures Plan

V.D.5. The Interim Measures Plan shall be incorporated into this permit in accordance with R315-3-4.3.

V.E. NOTIFICATION REQUIREMENTS FOR AND ASSESSMENT OF NEWLY IDENTIFIED SOLID WASTE MANAGEMENT UNITS

V.E.1. The Permittee shall notify the Executive Secretary in writing, by mail, or hand delivery, of any newly identified Solid Waste Management Unit(s) not identified in Condition V.A. The Permittee shall submit written notification within thirty (30) calendar days of discovering the Solid Waste Management Unit(s). The notification shall include the location of the new Solid Waste Management Unit(s) and information on the suspected or known wastes at the site.

V.E.2. Within one hundred twenty (120) calendar days following discovery of the Solid Waste Management Unit(s), the Permittee shall submit a Solid Waste Management Unit Assessment Plan to the Executive Secretary by mail or hand delivery.

V.E.3. The Solid Waste Management Unit Assessment Plan shall include the following:

V.E.3.i. Information concerning past and present operations at the unit(s); and

V.E.3.ii. Any groundwater, surface water, soil (surface or subsurface strata), or air sampling and analysis data needed to determine whether a release of hazardous waste and/or hazardous waste constituent(s) from such unit(s) is likely to occur. The Solid Waste Management Assessment Plan shall demonstrate that the sampling and analysis program, if applicable, is capable of yielding representative samples and must include parameters sufficient to identify migration of hazardous waste and/or hazardous waste constituent(s) from the newly discovered Solid Waste Management Units to the environment.

V.E.4. The Permittee shall receive written approval from the Executive Secretary for the Solid Waste Management Unit Assessment Plan; or

V.E.4.i The Permittee shall receive written notice from the Executive Secretary of the Solid Waste Management Unit Assessment Plan's deficiencies and the written notice will specify a due date for submittal of a revised assessment plan.

V.E.5. The Permittee shall implement the approved Solid Waste Management Assessment Plan within thirty (30) calendar days of approval.

V.E. 6. Within 90 days of completion of the Assessment, the Permittee shall submit a Solid Waste Management Unit Assessment Report. At a minimum, the Report shall provide the following information for each newly identified Solid Waste Management Unit:

V.E. 6.i. The Solid Waste Management Unit location identified on a map;

- V.E. 6.ii. The type and function of the unit, including general dimensions and a structural description;
- V.E. 6.iii. The period during which the unit was operated; and
- V.E. 6.iv. All wastes that were or are being managed at the Solid Waste Management Unit, including results of any sampling and analysis used to determine whether releases of hazardous wastes and/or hazardous waste constituent(s) have occurred, are occurring, or are likely to occur from the unit.

V.E. 7. Based on the results of Solid Waste Management Unit Assessment Report, the Executive Secretary shall determine the need for further investigations at specific unit(s) included in the Solid Waste Management Unit Assessment. If the Executive Secretary determines that such investigations are needed, the Permittee shall comply with the provisions of Condition V.C.

V.F. DETERMINATION OF NO FURTHER ACTIONS

V.F.1. The Permittee may petition the Executive Secretary to terminate the Corrective Action for Solid Waste Management Units Schedule of Compliance (Module V) in accordance with R315-8-6.11.

V.F.2. At a minimum, the Corrective Action for Solid Waste Management Units Schedule of Compliance termination petition shall contain information based on the RCRA Facility Investigation or other relevant information that demonstrates that there are no releases of hazardous waste or hazardous waste constituent(s) from Solid Waste Management Units at the Facility that pose a threat to human health or the environment in accordance with R315-102.

V.F.3. A determination of no further action, in accordance with Condition V.F.1., shall not preclude the Executive Secretary from requiring further investigations, studies, or remediation at a later date, if new information or subsequent analysis indicates a release or potential of a release from a Solid Waste Management Unit at the Facility that is likely to pose a threat to human health or the environment. In such a case, the Executive Secretary shall initiate either a modification to the Corrective Action Schedule of Compliance (Module V) in accordance with R315-3-4.3 to rescind the determination of V.F.1.

V.G. CORRECTIVE MEASURES STUDY AND IMPLEMENTATION

V.G.1. Based on the results of the RCRA Facility Investigation, the Permittee shall identify, screen, and develop the alternative or alternatives for removal, containment, treatment and/or other remediation of the contamination. The Permittee shall conduct the Corrective Measures Study in accordance with the requirements specified in Appendix B (Task I, II, III, and V).

- V.G.2. Upon the Executive Secretary's approval of the Corrective Measures Study, pursuant to Condition V.G.1., the Permittee shall prepare and submit, to the Executive Secretary, by mail or hand delivery, for approval, the Corrective Measures Implementation Program Plan, in accordance with the requirements specified in Appendix B, Task IV.A.
- V.G.3. Upon the Executive Secretary's approval of the Corrective Measures Implementation Program Plan, pursuant to Condition V.G.2., the Permittee shall conduct the Corrective Measures Implementation Program Plan in accordance with the requirements specified in Appendix B, Task IV [the corrective measures design (Task IV.B.) and construction of the corrective measures (Task IV.C.)].
- V.G.4. The Permittee shall conduct the Corrective Measures Study and prepare the Corrective Measures Implementation Program Plan, as specified in Conditions V.G.1. and V.G.2., in accordance with the schedule specified in Table 5.
- V.G.5. The Permittee shall prepare and submit to the Executive Secretary for approval a compliance schedule for conducting the Corrective Measures Implementation Program Plan, as required by Condition V.G.3.
- V.G.6. The Corrective Measures Study and Corrective Measures Implementation compliance schedules, specified in Table 5, shall be modified in accordance with R315-3-4.3.

V.H. REPORTING REQUIREMENTS

- V.H.1. The Permittee shall submit to the Executive Secretary signed quarterly progress reports of all activities (i.e., Interim Measures, RCRA Facility Investigation, Corrective Measures Study) conducted pursuant to the Conditions of Module V. The Permittee shall initially submit the quarterly progress reports no later than ninety (90) calendar days after the effective date.
- V.H.2. At a minimum, the quarterly progress reports shall contain the following:
- V.H.2.i. A description of the work completed;
 - V.H.2.ii. Summaries of all findings and all raw data;
 - V.H.2.iii. Summaries of all problems or potential problems encountered during the reporting period and actions taken or to be taken to rectify problems; and
 - V.H.2.iv. Projected work for the next reporting period.
- V.H.3. The Permittee shall maintain copies of other reports, drilling logs, etc. at the Facility during the effective period. The Permittee shall provide copies of the said reports, logs, etc. to the Executive Secretary upon request.
- V.H.4. As specified under Condition V.B.5., the Executive Secretary may require the Permittee to conduct new or more extensive assessments, investigations, or studies, as needed, based on information provided in these progress reports or other supporting information.

V.I. MODIFICATION OF THE CORRECTIVE ACTION SCHEDULE OF COMPLIANCE (MODULE V)

- V.I.1. Modifications of the final compliance dates pursuant to the Conditions in Module V shall be submitted to the Executive Secretary for approval, in accordance with R315-3-4.3. Corrective Action Schedule of Compliance (Module V) final compliance dates include the following (final compliance dates are noted on Tables 3, 4, 5):
- V.I.1.i. The compliance date(s), as specified in Tables 3 and 4, for submittal of the RCRA Facility Investigation Final Report (Appendix A, Task IV);
 - V.I.1.ii. The compliance date(s), as specified in Table 5, for submittal of the Corrective Measures Study Report, in accordance with Condition V.G.1.;
 - V.I.1.iii. The compliance date(s), as specified in Table 5, for submittal of the final Corrective Measures Implementation Program Plan, in accordance with Condition V.G.2.;
 - V.I.1.iv. Once established in accordance with Condition V.G.5., the compliance date(s) for submittal of the corrective measures final (100% completion) design and construction plans, in accordance with Condition V.G.3.;
 - V.I.1.v. Compliance dates, as specified in Tables 3, 4, and 5, for implementing the approved plans and/or reports; and
 - V.I.1.vi. Compliance dates for quarterly submittal of progress reports.
- V.I.2. Pursuant to R315-3-15, the compliance schedules specified in Tables 3, 4, and 5, shall be modified if the Executive Secretary determines that good cause exists for which the Permittee had no control and for which there is no reasonable available remedy.
- V.I.2.a. Failure to obtain adequate funds or appropriations to conduct the Corrective Measures Implementation Program Plan, pursuant to Condition V.G.3., shall be considered good cause for modification of the compliance schedule(s), Table 5, as specified in Condition V.I.2., only in accordance with the following Conditions:
- V.I.2.a.i. The Permittee shall use its best effort to secure all funds that may be required for implementation of the requirements specified in Condition V.G.3. pursuant to the compliance schedule in Table 5;
 - V.I.2.a.ii. If necessary, the Permittee shall seek, by the most expeditious means possible, appropriations from the U.S. Congress for funding to achieve the compliance schedule in Table 5. In accordance with Sections 1-4 and 1-5 of Executive Order 12088 as implemented by the Office of Management and Budget Circular A-106, as amended. Section 1-5 of Executive Order 12088 states "The head of each executive agency shall ensure that sufficient funds for compliance with applicable pollution control standards are requested in the Agency budget."

- V.I.2.a.iii. Immediately upon failure to obtain adequate funding, the Permittee shall submit to the Executive Secretary, by certified mail, express mail, or hand delivery, a written request and justification, for modification of the compliance schedule specified in Table 5. The written justification shall demonstrate that good cause exists, pursuant to Condition V.2.a. The Permittee shall also provide an alternate schedule of compliance for conducting the Corrective Measures Implementation for the subsequent fiscal year.
- V.I.2.a.iv. Upon evaluation, if the Executive Secretary determines that good cause exists in accordance with the Conditions under V.I.2.a., the Executive Secretary shall modify the compliance schedule.
- V.I.2.a.v. For any approved modification, the compliance schedule specified in Table 5 shall be modified to provide relief from the original compliance schedule time frames only for the subsequent fiscal year. All successive compliance dates after the end of such fiscal year shall be modified to reflect the original time frames specified prior to the modification request under Condition V.I.2.a.
- V.I.2.b. Failure to obtain adequate funds or appropriations from Congress shall not, in any way, release the Permittee from its obligation to comply with the Corrective Measures Implementation (as required by Condition V.G.3.) or any other requirement or RCRA.
- V.I.2.c. If adequate funds for Corrective Measures Implementation are not available, the Executive Secretary and the Board reserve the right to pursue any actions deemed necessary to protect human health and the environment, not excluding judicial recourse or termination.
- V.I.3. The Permittee shall submit a request for modifications of the interim compliance dates that do not affect the final compliance dates, to the Executive Secretary for approval. If the Executive Secretary approves the interim compliance date modifications, Tables 3, 4 and/or 5 shall incorporate the modified compliance dates as approved.

<p>TABLE 1</p> <p>SOLID WASTE MANAGEMENT UNITS (SWMU*) WITH SUSPECTED RELEASES</p>	
SWMU NUMBER	SWMU DESCRIPTION
1	Demilitarization Area/Disposal Pits
2	Gravel pits (Area 10)
3	Disposal pit (Southeast of Area 2)
4	Mortar pits (Southeast of Area 2)
5	Drainage pond and Leaching pit (next to Building 600) and Building 600
6 ^a	Building 600
7 ^a	Leaching pit (next to Building 600)
8	Surveillance Test Site
9	Area 2 (including mustard holding and pit areas)
10 ^b	Does not meet the definition of a SWMU
11	Chemical Munitions Storage Area (Area 10)
12 ^b	Does not meet the definition of a SWMU
13 ^e	SWMU listed on Table 2
14	Building S-108
15	Old demolition pit (Warehouse C-4200)
16 ^b	Does not meet the definition of a SWMU
17 ^c	SWMU listed on Table 2
18 ^d	SWMU not located at the Facility
19	Building 533
20	Building 521
21	Incendiary washout operations (Building S-554)
22	Incendiary washout basins
23	Demilitarization holding area (North of SWMU #1)
24 ^e	SWMU combined with number 36
25	Demilitarization area/Disposal pits
26	Sanitary landfill (active)
27	Sewage treatment plant
28	Inactive landfill (northeast corner)
29	Metal scrap landfill
30	Chemical Agent Munition Disposal System landfill

TABLE 1	
SOLID WASTE MANAGEMENT UNITS (SWMU*) WITH SUSPECTED RELEASES	
SWMU NUMBER	SWMU DESCRIPTION
31	Demilitarization area (North of SWMU #1)
32	Railroad scrap yard
33	Building 536
34	Building 4105
35 ^f	Building 533
36	Building 3200 and surrounding area
37 ^g	Slag piles and bomb fragments
<p>^a For the purposes of the corrective action under this permit, SWMU 6 and 7 have been combined with SWMU 5.</p> <p>^b Currently does not meet the definition of a Solid Waste Management Unit.</p> <p>^c SWMU with known-release(s), listed in Table 2.</p> <p>^d SWMU 18 is not included because it is located within Tooele-North.</p> <p>^e SWMU 24 is located in SWMU 36.</p> <p>^f SWMU 35 is the same unit as SWMU 19.</p> <p>^g SWMU 37 was identified after the Phase I investigation was complete.</p> <p>• The SWMU numbering corresponds to that used in Ground-water Consultation No. 38-26-1364-86, September 5, 1986, conducted by the U.S. Army Environmental Hygiene Agency and the RCRA Facility Assessment, December 1987, prepared for EPA.</p>	

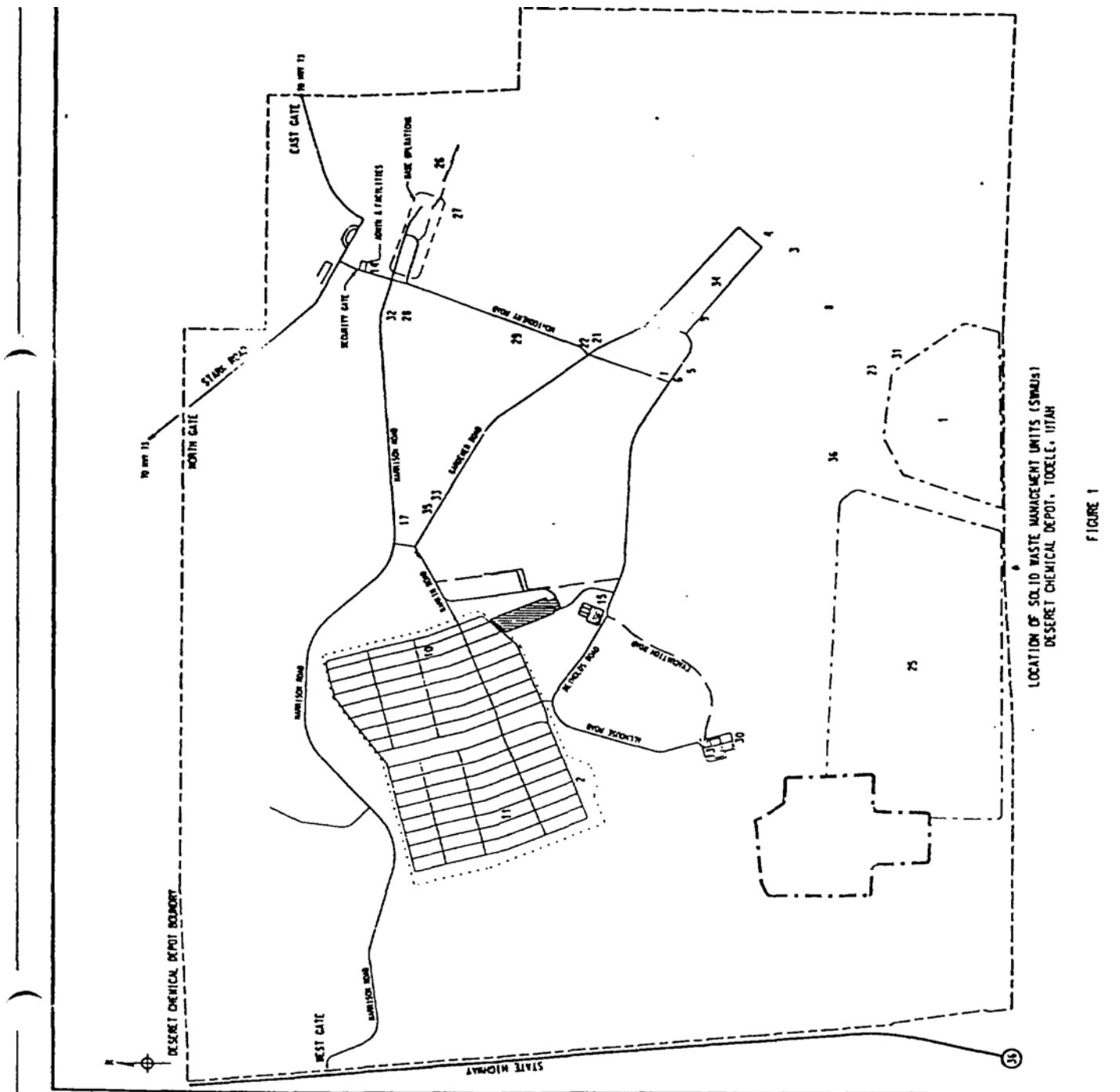
TABLE 2	
SOLID WASTE MANAGEMENT UNITS WITH KNOWN RELEASES	
SWMU Number	SWMU Description
13	Chemical Agent Munition Disposal System Diesel fuel and chromium release
17	Deactivation Furnace Mercury contamination
<p>* The SWMU numbering corresponds to that used in Ground-water Consultation No. 38-26-1364-86, September 5, 1986, conducted by the U.S. Army Environmental Hygiene Agency and the RCRA Facility Assessment, December 1987, prepared for EPA.</p> <p>** Additional SWMUs with suspected releases identified in Table 1.</p>	

TABLE 3 RCRA FACILITY INVESTIGATION COMPLIANCE SCHEDULE FOR SOLID WASTE MANAGEMENT UNITS (SWMUS) WITH SUSPECTED RELEASES	
RFI Activity	Due Date
SUBMIT RFI-PHASE WORKPLAN (APPENDIX A: TASK I.D.)	Within ninety (90) calendar days of the effective date of the permit.
SUBMIT FINAL APPENDIX A: TASK I REPORT	Within two hundred seventy (270) calendar days of the Executive Secretary's approval of the RFI-Phase I Workplan.
SUBMIT DRAFT RFI-PHASE II (APPENDIX A: TASK II & III) WORKPLAN AND SCHEDULE	Within ninety (90) calendar days of the Executive Secretary's approval of the final Task I Report.
INITIATE RFI-PHASE II (APPENDIX A: TASK II AND III) ACTIVITIES	Within sixty (60) calendar days of the Executive Secretary's approval of the Task II and III Workplan and schedule.
SUBMIT APPENDIX A: TASK IV DRAFT REPORT	As specified in the Executive Secretary approved RFI-Phase II (Task II and III) Workplan and schedule.
SUBMIT APPENDIX A: TASK IV FINAL AND SUMMARY REPORTS	As specified in the Executive Secretary approved RFI-Phase II (Task II and III) Workplan and schedule.
PROGRESS REPORTS ON APPENDIX A: TASKS I THROUGH IV	Quarterly (every 90-calendar days) beginning ninety (90) calendar days after the effective date of this permit.

TABLE 4 RCRA FACILITY INVESTIGATION COMPLIANCE SCHEDULE FOR SOLID WASTE MANAGEMENT UNITS (SWMUS) WITH KNOWN RELEASES	
RFI ACTIVITY	DUE DATE
SUBMIT FINAL TASK I REPORT (EXCLUDING RFI-PHASE I, TASK I.D.)	Within one hundred twenty (120) calendar days of the effective date of the permit.
SUBMIT DRAFT RFI-PHASE II (APPENDIX A: TASK II & III) WORKPLAN AND SCHEDULE	Within ninety (90) calendar days of the Executive Secretary's approval of the final Task I Report.
INITIATE RFI-PHASE II (APPENDIX A: TASK II AND III) ACTIVITIES	Within forty-five (45) calendar days of the Executive Secretary's approval of the Task II and III Workplan and schedule.
SUBMIT APPENDIX A: TASK IV DRAFT REPORT	As specified in the Executive Secretary approved RFI-Phase II (Task II and III) Workplan and schedule.
SUBMIT APPENDIX A: TASK IV FINAL AND SUMMARY REPORTS	As specified in the Executive Secretary approved RFI-Phase II (Task II and III) Workplan and schedule.
PROGRESS REPORTS ON APPENDIX A: TASKS	Quarterly (every 90-calendar days) beginning ninety (90) calendar days of the effective date of this permit.

TABLE 5 CORRECTIVE MEASURES STUDY AND IMPLEMENTATION COMPLIANCE SCHEDULE FOR SOLID WASTE MANAGEMENT UNITS (SWMUS)	
RFI ACTIVITY	DUE DATE
SUBMIT CMS WORKPLAN (Appendix B: TASK I & II)	Within sixty (60) calendar days of the Executive Secretary's approval of the RCRA Facility Investigation Final Report.
SUBMIT DRAFT CMS REPORT (Appendix B: TASK I, II, & III)	Within three hundred (300) calendar days of the Executive Secretary's approval of the CMS Workplan.
SUBMIT FINAL CMS REPORT (Appendix B: TASK I, II, & III)	Within sixty (60) calendar days of receiving the Executive Secretary's comments on the draft CMS Report.
SUBMIT DRAFT CMI PROGRAM PLAN (Appendix B: TASK IV.A.)	Within ninety (90) calendar days of the Executive Secretary's approval of the final CMS report.
SUBMIT DRAFT CMI PROGRAM PLAN (Appendix B: TASK IV.A.)	Within sixty (60) calendar days of the Executive Secretary's comments on the draft CMI Program Plan.
SUBMIT CORRECTIVE MEASURES DESIGN PRELIMINARY DESIGN APPROXIMATELY 30% COMPLETE	As specified in the Executive Secretary approved CMI Program Plan.
SUBMIT CORRECTIVE MEASURES DESIGN PRELIMINARY DESIGN APPROXIMATELY 60% COMPLETE	As specified in the Executive Secretary approved CMI Program Plan.
SUBMIT CORRECTIVE MEASURES DESIGN PRELIMINARY DESIGN APPROXIMATELY 95% COMPLETE	As specified in the Executive Secretary approved CMI Program Plan.
SUBMIT FINAL CORRECTIVE MEASURES DESIGN	As specified in the Executive Secretary approved CMI Program Plan.
PROGRESS REPORTS ON APPENDIX B: TASKS I THROUGH IV	Quarterly, every ninety-(90) calendar days beginning ninety (90) days after the Executive Secretary's approval of the final RFI report.
SUBMIT DRAFT CQA PROGRAM PLAN (APPENDIX B: TASK IV.C)	As specified in the Executive Secretary approved CMI Program Plan.
SUBMIT FINAL CQA PROGRAM PLAN	Within sixty (60) calendar days of the Executive Secretary's approval of the draft CQA.
CONSTRUCTION OF CORRECTIVE MEASURES	Within sixty (60) calendar days of the Executive Secretary's approval of the final CQA.
PREFINAL INSPECTION	Forty-five (45) calendar days following report of prefinal inspection.
CORRECTIVE MEASURE CONSTRUCTION REPORT	Within ninety (90) days following completion of construction.
CORRECTIVE MEASURES IMPLEMENTATION QUARTERLY PROGRESS REPORTS	Quarterly, every ninety (90) days after the Executive Secretary approves the final CMS Report.

FIGURE 1
LOCATION OF SOLID WASTE MANAGEMENT UNITS (SWMUS)
DESERET CHEMICAL DEPOT, TOOELE, UTAH



APPENDIX A RCRA FACILITY INVESTIGATION

TASK I: DESCRIPTION OF CURRENT CONDITIONS

The Permittee shall submit for the Executive Secretary's approval, the Task 1 final report identified in Table 3 Module V, providing the background information pertinent to the Facility (Deseret Chemical Depot), contamination and interim measures as set forth below. The data gathered during any previous investigations or inspections and other relevant data shall be included.

A. Background Information

1. Map(s) depicting the following:
 - a. All solid or hazardous waste treatment, storage or disposal areas including all solid waste management units, active after November 19, 1980;
 - b. All known past solid or hazardous waste treatment, storage or disposal areas including solid waste management units, regardless of whether they were active on November 19, 1980;
 - c. All known past or present product and waste underground tanks or piping;
 - d. The location of all production and groundwater monitoring wells. These wells shall be clearly labeled and ground and top of casing elevations and construction details included.

All maps shall be consistent with the requirements set forth in R315-3-3.2 and be of sufficient detail and accuracy to locate and report all current and future work performed at the site.

2. A history and description of ownership and operation, solid and hazardous waste generation, treatment, storage, and disposal activities at the Facility;
3. Approximate dates or periods of past spills (to aide in the evaluation of determining the source for any contamination), type of materials spilled, the amount spilled, the location where spilled, and a description of the response actions conducted, including any inspection reports or technical reports generated as a result of the response; and
4. A list of documents and studies prepared for the Facility.

B. Nature, Extent and Rate of Migration of Contamination

The Permittee shall prepare and submit for the Executive Secretary's approval the Task 1 final report identified in Table 3 Module V, describing the existing information on the nature and extent of contamination.

1. The report shall summarize all possible source areas of contamination. This, at minimum, should include all regulated units, solid waste management units, spill areas, and other suspected source areas of contamination. For each area, the Permittee shall identify the following:
 - a. Location of area (on a Facility map);
 - b. Quantities of solid and hazardous wastes;
 - c. Hazardous waste or constituents, to the extent known; and
 - d. Identification of areas where additional information is necessary.
2. The report shall include an assessment and description of the existing degree and extent of contamination. This should include:
 - a. Available monitoring data and qualitative information on locations and levels of contamination at the Facility;
 - b. All potential migration pathways including information on geology, pedology, hydrogeology, physiography, hydrology, hydrogeo-chemistry, water quality, meteorology, and air quality; and
 - c. The potential impact(s) on human health and the environment, including demography, groundwater and surface water use, and land use.

C. Past/Current Activities

The Permittee shall document investigatory and/or remedial activities, which were or are being undertaken at the Facility. This shall include:

1. Objectives of these activities; how the activities are mitigating potential threats to human health and the environment and/or are consistent with and integrated into RCRA Facility Investigation work at the Facility;
2. Design, construction, operation, and maintenance requirements;
3. Schedules for all activities, including progress reports.

D. RCRA Facility Investigation-Phase I

1. For each Solid Waste Management Unit in which a release of hazardous waste or hazardous waste constituents has not been documented, as specified on Table 1 of this permit, the Permittee shall conduct a RCRA Facility Investigation-Phase I to document a release or absence of a release of hazardous waste or hazardous waste constituents.

2. The Permittee shall prepare and submit a RCRA Facility Investigation-Phase I Workplan to the Executive Secretary for approval. The RCRA Facility Investigation-Phase I Workplan shall include the development of several plans, which shall be prepared concurrently. During the RCRA Facility Investigation, it may be necessary to revise the RCRA Facility Investigation-Phase I Workplan to increase or decrease the amount of information collected to accommodate the Facility specific situation. The Facility Investigation Phase I Workplan shall include, but not be limited to the following:
 - a. RCRA Facility Investigation-Phase I Project Management Plan:

The Permittee shall prepare a Project Management Plan, which will include a discussion of the technical approach, schedules, and personnel. The Project Management Plan shall evaluate each Solid Waste Management Unit based on its actual or potential threat to human health and the environment and prioritize the investigatory and/or remedial activities accordingly. The Project Management Plan shall also include a description of qualifications of personnel performing or directing the RCRA Facility Investigation, including contractor personnel. This plan shall also document the overall management approach to the RCRA Facility Investigation.
 - b. RCRA Facility Investigation-Phase I Data Collection Quality Assurance Plan:

The Permittee shall prepare a plan documenting all monitoring procedures, including; sampling, field measurements and sample analyses performed during the investigation to characterize the environmental setting, source, and contamination, so as to ensure that all information, data and resulting decisions are technically sound, statistically valid, and properly documented. The Data Quality Assurance Plan shall include, but not be limited to, the following:
 - i) The Data Collection Strategy section shall include, but not be limited to, the following:
 - a) The level of precision and accuracy for all data. Factors, which should be considered, include, environmental conditions at the time of sampling, number of sampling points, and the representativeness of selected media and selected analytical parameters.
 - b) Description of methods and procedures to assess the precision, accuracy and completeness of the measurement data;
 - c) Description of the measures to be taken to assure that data generated by the Permittee and by outside laboratories or consultants during the RCRA Facility Investigation-Phase I can be compared to each other. These data shall be comparable during the entire RCRA Facility Investigation.
 - d) Details relating to the schedule and information to be provided in quality assurance reports. The reports shall include, but not be limited to:

- 1) Periodic assessment of measurement data accuracy, precision, and completeness;
 - 2) Results of performance audits;
 - 3) Results of system audits; and
 - 4) Potential quality assurance problems and recommended solutions.
- ii) The Sampling section shall include, but not be limited to a discussion of the following:
- a) Selecting appropriate sampling locations, depths, etc.;
 - b) Providing a statistically significant number of sampling sites;
 - c) Determining conditions under which sampling should be conducted;
 - d) Determining which media are to be sampled (e.g., groundwater, air, soil, sediment, etc.);
 - e) Determining which parameters are to be measured and where;
 - f) Selecting the frequency of sampling and length of sampling period;
 - g) Selecting the type of samples (e.g., composites versus grabs) and number of samples to be collected;
 - h) Measures to be taken to prevent contamination of the sampling equipment and cross contamination between sampling points;
 - i) Documenting field sampling operations and procedures, including:
 - 1) Documentation of procedures for preparation of reagents or supplies, which become an integral part of the sample (e.g., filters, and adsorbing reagents);
 - 2) Procedures and forms for recording the exact location and specific considerations associated with sample acquisition;
 - 3) Documentation of specific sample preservation method;
 - 4) Calibration of field devices;
 - 5) Collection of replicate samples;
 - 6) Submission of field-biased blanks, where appropriate;
 - 7) Potential interferences present at the Facility;
 - 8) Construction materials and techniques associated with monitoring wells and piezometers;
 - 9) Field equipment listing and types of sample containers;
 - 10) Sampling order; and
 - 11) Decontamination procedures.
 - j) Selecting appropriate sample containers;
 - k) Sample preservation; and
 - 1) Chain-of-custody, including:
 - 1) Standardized field tracking reporting forms to establish sample custody in the field prior to and during shipment; and
 - 2) Prepared sample labels containing all information necessary for effective sample tracking.
- iii) The Field Measurements section shall include, but not be limited to, a discussion of the following:

- a) Selecting appropriate field measurement locations, depth, etc.;
 - b) Providing a statistically significant number of field measurements;
 - c) Measuring all necessary ancillary data;
 - d) Determining conditions under which field measurements should be conducted;
 - e) Determining which media are to be addressed by appropriate field measurements (e.g., groundwater, air, soil, sediment, etc.);
 - f) Determining which parameters are to be measured and where;
 - g) Selecting the frequency of field measurements and length of field measurements period; and
 - h) Documenting field measurement and procedures, including:
 - 1) Procedures and forms for recording raw data and the exact location, time and Facility-specific, considerations associated with the data acquisition;
 - 2) Calibration of field devices;
 - 3) Collection of replicate measurements;
 - 4) Submission of field-biased blanks;
 - 5) Potential interferences present at the Facility;
 - 6) Construction materials and techniques associated with monitoring wells and piezometers use to collect field data;
 - 7) Field equipment listing;
 - 8) Order in which field measurements were made; and
 - 9) Decontamination procedures.
- iv) The Sample analysis section shall specify the following:
- a) Chain-of-custody procedures, including:
 - 1) Identification of a responsible party to act as sample custodian at the laboratory Facility authorized to sign for incoming field samples, obtain documents of shipment, and verify the data entered onto the sample custody records;
 - 2) Provision for a laboratory sample custody log consisting of serially numbered standard lab-tracking report sheets; and
 - 3) Specification of laboratory sample custody procedures for sample handling, storage, and dispersement for analysis.
 - b) Sample storage procedures and storage times;
 - c) Sample preparation methods;

- d) Analytical procedures, including:
 - 1) Scope and application of the procedure;
 - 2) Sample matrix;
 - 3) Potential interferences;
 - 4) Precision and accuracy of the methodology; and
 - 5) Method detection limits.
 - e) Calibration procedures and frequency;
 - f) Data reduction, validation and reporting;
 - g) Internal quality control checks, laboratory performance and systems audits and frequency, including, but not limited to:
 - 1) Method blank(s);
 - 2) Laboratory control sample(s);
 - 3) Calibration check sample(s);
 - 4) Replicate sample(s);
 - 5) Matrix-spiked sample(s);
 - 6) "Blind" quality control sample(s);
 - 7) Control charts;
 - 8) Surrogate samples;
 - 9) Zero and span gases; and
 - 10) Reagent quality control checks.
 - h) Preventive maintenance procedures and schedules;
 - i) Corrective action (for laboratory problems); and
 - j) Turnaround time.
- c. RCRA Facility Investigation-Phase I Data Management Plan:
- The Permittee shall develop and initiate a RCRA Facility Investigation-Phase I Data Management Plan to document and track investigation data and results. This plan shall identify and set up data documentation materials and procedure, project file requirements, and project related progress reporting procedures and documents. The plan shall also provide the format to be used to present the raw data and conclusions of the investigation.
- i) The data record shall include the following:
 - a) Unique sample or field measurement code;
 - b) Sampling or field measurement location and sample or measurement type;
 - c) Sampling or field measurement raw data;
 - d) Laboratory analysis ID number;
 - e) Result of analysis.
 - ii) The following data shall be presented in tabular displays:

- a) Raw data;
 - b) Results for each medium, or for each constituent monitored;
 - c) Data reduction for statistical analysis;
 - d) Sorting of data by potential stratification factors (e.g., location, soil layer, topography); and
 - e) Summary data.
- iii) The following shall be presented in graphical formats (e.g., bar graphs, line graphs, area or plan maps, isopleth plots, cross-sectional plots or transects, three dimensional graphs, etc.):
- a) Sampling location and sampling grid;
 - b) Boundaries of sampling area, and areas where more data are required;
 - c) Levels and extent of contamination at each sampling location;
 - d) Contamination levels, averages, and maxima;
 - e) Changes in concentration in relation to distance from the source, time, depth or other parameters; and
 - f) Features affecting intramedia transport and potential receptors.
- d. RCRA Facility Investigation-Phase I Health and Safety Plan:
- The Permittee shall prepare a Health and Safety Plan, which shall include:
- i) Facility description including delineation of work area and availability of resources such as roads, water supply, electricity, and telephone service;
 - ii) Known hazards and risks associated with each activity conducted;
 - iii) Key personnel and alternatives responsible for site safety, response operations, and for protection of public health;
 - iv) Levels of protection to be worn by personnel in work areas (and justification);
 - v) Procedures to control site access;
 - vi) The Facility Health and Safety Plan shall be consistent with all applicable federal, State, and local regulations such as:
 - a) NIOSH Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985);
 - b) EPA Order 1440.1 - Respiratory Protection;
 - c) EPA Order 1440.3 - Health and Safety Requirements for Employees engaged in Field Activities;
 - d) Facility Contingency Plan;
 - e) EPA Standard Operating Safety Guide (1984);
 - f) OSHA regulations, particularly in 29 CFR 1910 and 1926; including Interim Final Rule (29 CFR Part 1910) published in the December 19, 1986, Federal Register;
 - g) State and local regulations; and
 - h) Other applicable EPA guidance.

3. Determination of Further Action

- a. The Permittee shall provide recommendations for further investigation under a RCRA Facility Investigation-Phase II at the identified Solid Waste Management Unit(s) based on documentation of a known or prior release from the specified Solid Waste Management Unit(s) in the final Appendix A, Task I report.
- b. The list of recommended Solid Waste Management Unit(s) for further investigation under a RCRA Facility Investigation Phase I shall be prioritized based on the actual or potential threat to human health or the environment.

TASK II: RCRA FACILITY INVESTIGATION-PHASE II WORKPLAN

The Permittee shall prepare a RCRA Facility Investigation-Phase II Workplan. This RCRA Facility Investigation-Phase II Workplan shall include the development of several plans, which shall be prepared concurrently. During the RCRA Facility Investigation, it may be necessary to revise the RCRA Facility Investigation-Phase II Workplan to increase or decrease the amount of information collected to accommodate the Facility specific situation. The RCRA Facility Investigation-Phase II Workplan shall include, but not be limited to, the following:

A. Project Management Plan

The Permittee shall prepare a Project Management Plan, which will include a discussion of the technical approach, schedules, budget, and personnel. The Project Management Plan shall each evaluate each SWMU based on its actual or potential threat to human health and the environment and prioritize the investigatory and/or remedial activities accordingly. The Project Management Plan shall also include a description of qualifications of personnel performing or directing the RCRA Facility Investigation, including contractor personnel. This plan shall also document the overall management approach to the RCRA Facility Investigation.

B. Data Collection Quality Assurance Plan

The Permittee shall prepare a plan documenting all monitoring procedures, including; sampling, field measurements and sample analyses performed during the investigation to characterize the environmental setting, source, and contamination, so as to ensure that all information, data and resulting decisions are technically sound, statistically valid, and properly documented.

1. The Data Collection Strategy section of the Data Collection Quality Assurance Plan shall include but not be limited to the following:
 - a. The level of precision and accuracy for all data. Factors, which should be considered, include, environmental conditions at the time of sampling, number of sampling points, and the representativeness of selected media and selected analytical parameters.
 - b. Description of methods and procedures to assess the precision, accuracy and completeness of the measurement data;

- c. Description of the measures to be taken to assure that data generated by the Permitted and by outside laboratories or consultants during the RCRA Facility Investigation-Phase II can be compared to each other. The data shall be comparable during the entire RCRA Facility Investigation.
 - d. Details relating to the schedule and information to be provided in quality assurance reports. The reports should include but not be limited to:
 - i) Periodic assessment of measurement data accuracy, precision, and completeness;
 - ii) Results of performance audits;
 - iii) Results of system audits; and
 - iv) Potential quality assurance problems and recommended solutions.
2. The Sampling section of the Data Collection Quality Assurance Plan shall discuss:
- a. Selecting appropriate sampling locations, depths, etc.;
 - b. Providing a statistically significant number of sampling sites;
 - c. Determining conditions under which sampling should be conducted;
 - d. Determining which media are to be sampled (e.g., groundwater, air, soil, sediment, etc.);
 - e. Determining which parameters are to be measured and where;
 - f. Selecting the frequency of sampling and length of sampling period;
 - g. Selecting the type of samples (e.g., composites versus grabs) and number of samples to be collected;
 - h. Measures to be taken to prevent contamination of the sampling equipment and cross contamination between sampling points;
 - i. Documenting field sampling operations and procedures, including:
 - i) Documentation of procedures for preparation of reagents or supplies, which become an integral part of the sample (e.g. filters; and adsorbing reagents);
 - ii) Procedures and forms for recording the exact location and specific considerations associated with sample acquisition;
 - iii) Documentation of specific sample preservation method;
 - iv) Calibration of field devices;
 - v) Collection of replicate samples;
 - vi) Submission of field-biased blanks, where appropriate;
 - vii) Potential interferences present at the Facility;
 - viii) Construction materials and techniques, associated with monitoring wells and piezometers;
 - ix) Field equipment listing and types of sample containers;

- x) Sampling order; and
 - xi) Decontamination procedures.
 - j. Selecting appropriate sample containers;
 - k. Sample preservation; and
 - l. Chain-of-custody, including:
 - i) Standardized field tracking reporting forms to establish sample custody in the field prior to and during shipment; and
 - ii) Prepared sample labels containing all information necessary for effective sample tracking.
- 3. The Field Measurements section of the Data Collection Quality Assurance Plan shall discuss:
 - a. Selecting appropriate field measurement locations, depth, etc.;
 - b. Providing a statistically significant number of field measurements;
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 - d. Determining conditions under which field measurements should be conducted;
 - e. Determining which media are to be addressed by appropriate field measurements (e.g., groundwater, air, soil, sediment, etc.);
 - f. Determining which parameters are to be measured and where;
 - g. Selecting the frequency of field measurements and length of field measurements period; and
 - h. Documenting field measurement and procedures, including:
 - i) Procedures and forms for recording raw data and the exact location, time and Facility-specific considerations associated with the data acquisition;
 - ii) Calibration of field devices;
 - iii) Collection of replicate measurements;
 - iv) Submission of field-biased blanks;
 - v) Potential interferences present at the Facility;
 - vi) Construction materials and techniques associated with monitoring wells and piezometers use to collect field data;
 - vii) Field equipment listing;
 - viii) Order in which field measurements were made; and
 - ix) Decontamination procedures.
- 4. The Sample analysis section of the Data Collection Quality Assurance Plan shall specify the following:

- a. Chain-of-custody procedures, including:
 - i) Identification of a responsible party to act as sample custodian at the laboratory facility authorized to sign for incoming field samples, obtain documents of shipment, and verify the data entered onto the sample custody records;
 - ii) Provision for a laboratory sample custody log consisting of serially numbered standard lab tracking report sheets; and
 - iii) Specification of laboratory sample custody procedures for sample handling, storage, and dispersement for analysis.
- b. Sample storage procedures and storage times;
- c. Sample preparation methods;
- d. Analytical procedures, including:
 - i) Scope and application of the procedure;
 - ii) Sample matrix;
 - iii) Potential interferences;
 - iv) Precision and accuracy of the methodology; and
 - v) Method detection limits.
- e. Calibration procedures and frequency;
- f. Data reduction, validation and reporting;
- g. Internal quality control checks, laboratory performance and systems audits and frequency, including:
 - i) Method blank(s);
 - ii) Laboratory control sample(s);
 - iii) Calibration check sample(s);
 - iv) Replicate sample(s);
 - v) Matrix-spiked sample(s);
 - vi) "Blind" quality control sample(s);
 - vii) Control charts;
 - viii) Surrogate samples;
 - ix) Zero and span gases; and
 - x) Reagent quality control checks.
- h. Preventive maintenance procedures and schedules;
- i. Corrective action for laboratory problems; and
- j. Turnaround time.

c. **Data Management Plan**

The Permittee shall develop and initiate a Data Management Plan to document and track investigation data and results. This plan shall identify and set up data documentation materials and procedures, project file requirements, and project related progress reporting procedures and documents. The plan shall also provide the format to be used to present the raw data and conclusions of the investigation.

1. The data record shall include the following:
 - a. Unique sample or field measurement code;
 - b. Sampling or field measurement location and sample or measurement type;
 - c. Sampling or field measurement raw data;
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2. The following data shall be presented in tabular displays:
 - a. Raw data;
 - b. Results for each medium, or for each constituent monitored;
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 - d. Sorting of data by potential stratification factors (e.g., location, soil layer, topography); and
 - e. Summary data.
3. The following shall be presented in graphical formats (e.g., bar graphs, line graphs, area or plan maps, isopleth plots, cross-sectional plots or transects, three dimensional graphs, etc.):
 - a. Sampling location and sampling grid;
 - b. Boundaries of sampling area, and areas where more data are required;
 - c. Levels and extent of contamination at each sampling location;
 - d. Contamination levels, averages, and maxima;
 - e. Changes in concentration in relation to distance from the source, time, depth or other parameters; and
 - f. Features affecting transport and potential receptors.

D. Health and Safety Plan

1. The Permittee shall prepare a Health and Safety Plan, which shall include:
 - a. Facility description including delineation of work area and availability of resources such as roads, water supply, electricity, and telephone service;
 - b. Known hazards and risks associated with each activity conducted;
 - c. Key personnel and alternatives responsible for site safety, response operations, and for protection of public health;
 - d. Levels of protection to be worn by personnel in work areas (and justification);
 - e. Procedures to control site access;
2. The Facility Health and Safety Plan shall be consistent with all applicable federal, State, and local regulations such as:

- a. NIOSH Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985);
- b. EPA Order 1440.1 - Respiratory Protection;
- c. EPA Order 1440.3 - Health and Safety Requirements for Employees engaged in Field Activities;
- d. Facility Contingency Plan;
- e. EPA Standard operating Safety Guide (1984);
- f. OSHA regulations, particularly in 29 CFR 1910 and 1926; including Interim Final Rule (29 CFR Part 1910) published in the December 19, 1986, Federal Register;
- g. State and local regulations; and
- h. Other applicable EPA guidance.

E. Community Relations Plan

The Permittee shall prepare a plan for the dissemination of information to the public regarding investigation activities and results.

TASK III: FACILITY INVESTIGATION

The Permittee shall conduct a facility investigation adequate to characterize the Facility (environmental setting), define the source(s) and degree and extent of contamination, and identify actual or potential receptors. This investigation shall be conducted in accordance with Task II and shall produce data of adequate technical quality to support the development and evaluation of the corrective measure alternative or alternatives during the Corrective Measures Study.

A. Environmental Setting

The Permittee shall collect information on the environmental setting at the Facility, as follows:

1. Hydrogeology

- a. A description of the regional and site specific geologic and hydrogeologic characteristics affecting groundwater flow beneath the Facility, including:
 - i) Regional and site specific stratigraphy; description of strata including strike and dip, identification of stratigraphic contacts;
 - ii) Structural geology: description of local and regional structural features (e.g., folding, faulting, tilting, jointing, etc.);
 - iii) Depositional history;
 - iv) Locations and amounts of recharge and discharge;
 - v) Regional and site-specific groundwater flow, including seasonal and temporal variations in the groundwater flow regime.

- b. An analysis of any topographic features that might influence the groundwater flow system. (Note: Stereographic analysis of aerial photographs may aid in this analysis.)
- c. Based on field data, test, and cores, a representative and accurate classification and description of the hydrogeologic units which may be part of the migration pathways at the Facility (i.e., the aquifers and any intervening saturated and unsaturated units), including:
 - i) Hydraulic conductivity and porosity (total and effective);
 - ii) Lithology, grain size, sorting, degree of cementation;
 - iii) An interpretation of hydraulic interconnections between saturated zones; and
 - iv) The attenuation capacity and mechanisms of the natural earth materials (e.g., ion exchange capacity, organic carbon content, mineral content etc.).
- d. Based on field studies and cores, structural and hydrogeologic cross sections showing the extent (depth, thickness, lateral extent) of hydrogeologic units which may be part of the migration pathways identifying:
 - i) Sand and gravel deposits in unconsolidated deposits;
 - ii) Zones of fracturing or channeling in consolidated or unconsolidated deposits;
 - iii) Zones of high and low permeability that might direct and restrict the flow of contaminants;
 - iv) The uppermost aquifer: geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs; and
 - v) Water bearing zones above the first confining layer that may serve as pathways for contaminant migration including perched zones of saturation.
- e. Based on data obtained from ground-water monitoring wells and piezometers installed upgradient and downgradient of the potential contaminant source(s), a representative description of water level or fluid pressure monitoring including:
 - i) Potentiometric maps;
 - ii) Hydrologic cross sections showing vertical gradients;
 - iii) The flow system, including the vertical and horizontal components of flow; and
 - iv) Any temporal changes in hydraulic gradients, for example, due to seasonal influences.
- f. A description of manmade influences that may affect the Hydrogeology of the site, identifying:

- i) Active and inactive local water-supply and production wells with an approximate schedule of pumping; and
- ii) Manmade hydraulic structures (pipelines, french drains, ditches, unlined ponds, septic tanks, National Pollution Discharge Elimination System or Utah Pollution Discharge Elimination System outfalls, retention areas, etc.).

2. Soils

The Permittee shall characterize the soil and rock units above the water table in the vicinity of the contaminant release(s). Such characterization shall include but not be limited to, the following information:

- a. USCS soil classification;
- b. Surface soil distribution;
- c. Soil profile, including ASTM classification of soils;
- d. Transects of soil stratigraphy;
- e. Hydraulic Conductivity (saturated and unsaturated);
- f. Relative permeability;
- g. Bulk density;
- h. Porosity;
- i. Soil sorptive capacity;
- j. Cation exchange capacity;
- k. Soil organic content;
- l. Soil pH;
- m. Particle size distribution;
- n. Depth of water table;
- o. Moisture content;
- p. Effect of stratification on unsaturated flow;
- q. Infiltration;
- r. Evapotranspiration;
- s. Storage capacity;
- t. Vertical flow rate;
- u. Mineral content; and
- v. Redox potential.

3. Surface Water and Sediment

The Permittee shall characterize the temporal and permanent surface water bodies in the vicinity of the Facility. Such characterization shall include, but not be limited to, the following information:

- a. Location, elevation, surface area, inflow, outflows, depth, temperature stratification, and volume for lakes and estuaries;
- b. Location, elevation, surface area, depth, volume, freeboard, and purpose of impoundment for surface impoundments;
- c. Location, elevation, flow, velocity, depth, width, seasonal fluctuations, and flooding tendencies (i.e., 100 year event) for streams, ditches, drains, swamps and channels;

- d. Drainage patterns; and
- e. Evapotranspiration.
- f. Description of the chemistry of the natural surface water and sediments. This includes determining the pH, total dissolved solids, total suspended solids, biological oxygen demand, alkalinity, conductivity, dissolved oxygen profiles, nutrients (NH_3 , NO_3^{-1} / NO_3^{-2} , PO_4^{-3}), chemical oxygen demand, total organic carbon, specific contaminant concentrations, etc.
- g. Description of sediment characteristics including, deposition area, thickness profile, and physical and chemical parameters (e.g., grain size, density, organic carbon content, ion exchange capacity, pH, etc.)

4. Air

The Permittee shall provide information characterizing the climate in the vicinity of the Facility. Such information shall include, but not be limited to:

- a. A description of the following parameters:
 - i) Annual and monthly rainfall averages;
 - ii) Monthly temperature averages and extremes;
 - iii) Wind speed and direction;
 - iv) Relative humidity/dew point;
 - v) Atmospheric pressure;
 - vi) Evaporation data;
 - vii) Development of inversions; and
 - viii) Climate extremes that have been known to occur in the vicinity of the Facility, including frequency of occurrence.
- b. A description of topographic and manmade features, which affect air flow and emission patterns, including:
 - i) Ridges, hills or mountain areas;
 - ii) Canyons or valleys;
 - iii) Surface water bodies (e.g. rivers, lakes, bays, etc.);
 - iv) Wind breaks and forests; and
 - v) Buildings.

B. Source Characterization

The Permittee shall collect analytical data to characterize the wastes and the areas where wastes have been placed, collected or removed including: type, quantity, physical form, disposition, and Facility characteristics affecting release (e.g., Facility security, and engineered barriers). This shall include quantification of the following specific characteristics, at each source area:

- 1. Unit/Disposal Area Characteristics:

- a. Location of unit/disposal area;
 - b. Type of unit/disposal area;
 - c. Design features;
 - d. Operating practices (past and present);
 - e. Period of operation;
 - f. General physical conditions; and
 - g. Method used to close the unit/disposal area
2. Waste Characteristics:
- a. Type of waste placed in the unit;
 - i) Hazardous classification (e.g., ignitable, reactive, corrosive, TCLP);
 - ii) Quantity; and
 - iii) Chemical composition.
 - b. Physical, chemical, and biological characteristics;
 - i) Physical form (solid, liquid, gas);
 - ii) Physical description (e.g., powder, oily sludge)
 - iii) Temperature;
 - iv) pH;
 - v) General chemical class (e.g., acid, base, solvent);
 - vi) Molecular weight
 - vii) Density;
 - viii) Boiling point;
 - ix) Viscosity;
 - x) Solubility in water;
 - xi) Cohesiveness of the waste;
 - xii) Vapor pressure;
 - xiii) Flash point
 - xiv) Sorption;
 - xv) Biodegradability, bioconcentration, biotransformation;
 - xvi) Photodegradation rates;
 - xvii) Hydrolysis rates; and
 - xviii) Chemical transformations.

The Permittee shall document the procedures used in making the above determinations.

C. Contamination Characterization

The Permittee shall collect analytical data on groundwater, soils, surface water, sediment, and subsurface gas contamination in the vicinity of the Facility. These data shall be sufficient to define the extent, origin, direction, and rate of movement of contaminant plumes. Data shall include time and location of sampling, media sampled, concentrations found, and conditions during sampling, and the identity of the individuals performing the sampling and analysis. The data shall also include an assessment of the risk of explosion from each SWMU. The Permittee shall address the following types of contamination at the Facility:

1. Groundwater Contamination

The Permittee shall conduct a ground-water investigation to characterize any plumes of contamination at the Facility. This investigation shall at a minimum provide the following information:

- a. A description of the horizontal and vertical extent of any immiscible or dissolved contaminant plume(s) originating from the Facility;
- b. The horizontal and vertical direction of contamination movement;
- c. The velocity of contaminant movement;
- d. The horizontal and vertical concentration profiles of reasonably suspected chemical agents (R315-2-1.9(e) (1)) and reasonably suspected 40 CFR Section 260, Appendix-IX hazardous constituents in the plume(s);
- e. An evaluation of factors influencing the plume movement; and
- f. An extrapolation of future contaminant movement.

2. Soil Contamination

The Permittee shall conduct an investigation to characterize any contamination of the soil and rock units above the water table in the vicinity of the contaminant release. The investigation shall include the following information:

- a. A description of the vertical and horizontal extent of any contamination;
- b. A description of contaminant and soil chemical properties within the contaminant source area and plume. This precludes contaminant solubility, speciation, adsorption, leachability, exchange capacity, biodegradability, hydrolysis, photolysis, oxidation and other factors that might affect contaminant migration and transformation;
- c. Specific contaminant concentrations;
- d. The velocity and direction of contaminant movement; and
- e. An extrapolation of future contaminant movement.

3. Surface Water and Sediment Contamination

The Permittee shall conduct an investigation of surface water contamination at the Facility. The investigation shall include, but not be limited to, the following information:

- a. A description of the horizontal and vertical extent of any immiscible or dissolved contaminant plume(s) originating from the Facility, and the extent of contamination in underlying sediments;
- b. The horizontal and vertical direction of contaminant movement;
- c. The contaminant velocity;

- d. An evaluation of the physical, biological and chemical factors influencing contaminant movement;
- e. An extrapolation of future contaminant movement; and
- f. A description of the chemistry of the contaminated surface waters and sediments. This includes determining the pH, total dissolved solids, specific contaminant concentrations, etc.;

4. Air Contamination

The Permittee shall conduct an investigation to characterize the particulate and gaseous contaminants released into the atmosphere. This investigation shall provide the following information:

- a. A description of the horizontal and vertical direction and velocity of contaminant movement;
- b. The rate and amount of the release; and
- c. The chemical and physical composition of the contaminant(s) released, including horizontal and vertical concentration profiles.

5. Subsurface Gas Contamination

The Permittee shall conduct an investigation to characterize subsurface gases emitted from buried hazardous waste and hazardous constituents in the ground water. This investigation shall include the following information:

- a. A description of the horizontal and vertical extent of subsurface gases migration;
- b. The chemical composition of the gases being emitted;
- c. The rate, amount, and density of the gases being emitted; and
- d. Horizontal and vertical concentration profiles of the subsurface gases emitted.

The Permittee shall document all the procedures used in making the above determinations.

D. Potential Receptors

The Permittee shall collect data describing the human populations and environmental systems that may be affected by contaminant exposure from the Facility. Chemical analysis of biological samples may be needed. Data on observable effects in ecosystems may also be obtained. The following characteristics shall be identified:

- 1. Current and possible future uses of ground water and surface water, including type of use and location of ground water users.

2. Human use of or access to the Facility and adjacent lands, including but not limited to:
 - a. Recreation;
 - b. Hunting;
 - c. Residential;
 - d. Commercial;
 - e. Zoning; and
 - f. Relationship between population locations and prevailing wind direction.
3. A description of the biota in surface water bodies on, adjacent to, or affected by the Facility.
4. A description of the ecology overlying and adjacent to the Facility.
5. A demographic profile of the people who use or have access to the Facility and adjacent land, including, but not limited to; age, sex, and sensitive subgroups.
6. A description of any endangered or threatened species near the Facility.

TASK IV: INVESTIGATION ANALYSIS

The Permittee shall prepare an analysis and summary of all Phase II Facility investigations and their results. The objective of this task shall be to ensure that the investigation data are sufficient in quality and quantity to describe the nature and extent of contamination, potential threat to human health and/or the environment, and to produce the Corrective Measures Study.

A. Data Analysis

The Permittee shall analyze all Facility investigation data outlined in Task IV and prepare a report on the type-and extent of contamination at the Facility including sources and migration pathways. The report shall describe the extent of contamination (qualitative/quantitative) in relation to background levels at the Deseret Chemical Depot.

B. Protection Standards

1. Ground-water Protection Standards

For all units identified in Phase I RFI, the Permittee shall provide information to support the Executive Secretary's selection/development of Ground-water Protection Standards for all of the 40 CFR 264 Appendix IX constituents found in the ground water during the Facility Investigation.

- a. The Ground-water Protection Standards shall consist of:
 - i) The background level of a constituent of chemical agent in the groundwater; or

- ii) For any of the constituents listed in Table I of R315-8-6.5, the respective value given in Table 1 of the background level of the constituent is below the value give in Table 1; or
- iii) A proposed Alternate Concentration Limits. The Permittee shall include a justification based upon the criteria specified in R315-8-6.5(b) and R315-101, the Executive Secretary shall approve the Alternate Concentration Limit (ACL)..

2. Soil Protection Standards

For all units identified in Phase I RFI, the Permittee shall provide information to support the Executive Secretary's selection/development of Soil Protection Standards for all of the R315-50-1L constituents and chemical agents (P999 and F999, R315-2-1.8 and R315-2-1.9) found in the soil during the Facility Investigation (Task IV).

- a. The Soil Protection Standards shall consist of:
 - i) The background concentration levels for any suspected R315-50-10 inorganic constituent(s) in the soil shall be established by collecting a minimum of sixteen (16) background samples in similar geologic strata (location of background samples shall be approved by the Executive Secretary) and establishing an initial background arithmetic mean and variance for each inorganic constituents. The arithmetic mean and variance shall be calculated based on at least four (4) replicate measurements of each constituent and comparing these results with it's initial background arithmetic mean. The comparison shall consider individually each inorganic constituent, and shall use Cochran's Approximation to the Behrens-Fisher Student's T-test at the 0.05 level of confidence, as specified in R315-50-1F(b) and;
 - ii) The background concentration levels for any suspected R315-50-10 organic constituent(s) in the soil shall be zero (0) or below the method detection limit for that constituent and;
 - iii) The detection limits for determining agent concentrations in soil is technology driven and shall be evaluated at the time that the plan is submitted for approval or;
 - iv) .A proposed Alternate Significance Limit. The Permittee shall include a justification based upon the criteria specified in R315-101. The Executive Secretary shall approve the Alternate Significance Limit.
- b. The levels of contamination shall not be allowed to degrade beyond the existing contamination levels determined through appropriate monitoring or the use of other data accepted by the Executive Secretary, in accordance with R315-101-3.

3. Other Relevant Protection Standards

The Permittee shall identify all relevant and applicable standards for the protection of human health and the environment (e.g. National Ambient Air Quality Standards, State or federal approved water quality standards, etc.).

TASK V: SCHEDULE OF ACTIVITIES AND REPORTS

A. Progress Reports

The Permittee shall at a minimum provide the Executive Secretary with signed, quarterly progress reports containing:

1. A description and estimate of the percentage of the RCRA Facility Investigation-Phase I and the RCRA Facility Investigation-Phase II completed;
2. Summaries of all findings;
3. Summaries of all changes made in the RCRA Facility Investigation during the reporting period;
4. Summaries of all contacts with representatives of the local community, public interest groups or State government during the reporting period;
5. Summaries of all problems or potential problems encountered during the reporting period;
6. Actions being taken to rectify problems;
7. Changes in personnel during the reporting period;
8. Projected work for the next reporting period; and
9. Copies of daily reports, inspection reports, laboratory/monitoring data, etc.

B. RCRA Facility Investigation - Task I Final Report

1. The Permittee shall submit the RCRA Facility Investigation Task I Final and Summary Reports to the Executive Secretary. The Final Report shall describe the procedures, methods, and results of the RCRA Facility Investigations Phase I findings for the Solid Waste Management Units under investigation in Phase I and their releases, including information on the type and extent of contamination at the Facility, sources and migration pathways, and actual or potential receptors. The Report shall present all information gathered under the approved RCRA Facility Investigation-Phase I Workplan and schedule. The Final Report shall contain adequate information to support corrective action decisions at the Facility. The Summary Report shall summarize the findings in the Final Report.
2. After the Permittee submits the Final and Summary Reports, the Executive Secretary shall either approve or disapprove the Reports in writing.

If the Executive Secretary determines that the Final and Summary Reports are not adequate, the Executive Secretary shall notify the Permittee in writing of the Reports' deficiencies and specify a due date for submittal of the revised Final and Summary Task I Reports.

C. RCRA Facility Investigation-Phase II (Task II & III) Final Report

1. The Permittee shall submit RCRA Facility Investigation-Phase II, Task II & III Final and Summary Reports. The Final Reports shall describe the procedures, methods, and results of the Phase II Facility investigations of Solid Waste Management Units and their releases, including information on the type and extent of contamination at the Facility, sources and migration pathways, and actual or potential receptors. The Reports shall present all information gathered under the approved Task IV workplan and schedule. The Final Report shall contain adequate information to support further corrective action decisions at the Facility. The Summary Report shall summarize the findings in the Final Report.
2. After the Permittee submits the Final and Summary Reports, the Executive Secretary shall either approve or disapprove the Reports in writing. If the Executive Secretary determines that the Final and Summary Reports are not adequate, the Executive Secretary shall notify the Permittee in writing of the Reports' deficiencies and specify a due date for submittal of revised Final and Summary Reports. The permit shall be modified in accordance to R315-3-4.2 to include the approved Final and Summary Reports.

D. RCRA Facility Investigation Schedule

The Permittee shall perform the RCRA Facility Investigation activities in accordance with the schedules specified in Tables 3 and 4 of this Permit.

APPENDIX B

CORRECTIVE MEASURES STUDY AND IMPLEMENTATION

TASK I: DEVELOPMENT OF CORRECTIVE ACTION ALTERNATIVES (S)

Based on the results of the RCRA Facility Investigation, the Permittee shall identify, screen and develop the alternative or alternatives for removal, containment, treatment and/or other remediation of the contamination based on the objectives established for the corrective action.

A. Description of Current Situation

The Permittee shall submit an update to the information describing the current situation at the facility and the known nature and extent of the contamination as documented by the RCRA Facility Investigation Phase II Final Report. The Permittee shall provide an update to the information presented in the Phase II Final Report to the Executive Secretary regarding previous response activities and any interim measures, which may have or are being implemented at the Facility.

B. Establishment of Corrective Action Objectives

The Permittee shall establish site-specific objectives for the corrective action. These objectives shall be based on protection of human health and the environment, information gathered during the RCRA Facility Investigation, EPA guidance, and the requirements of any applicable State and federal statutes. At a minimum, all corrective actions concerning groundwater releases from units identified in all Phase I Final RFI Reports must be consistent with, and as stringent as, those required under R315-8-6.11 and R315-101.

C. Screening of Corrective Measure Technologies

The Permittee shall review the results of the RCRA Facility Investigation to identify technologies which are appropriate for the Facility. The Permittee shall screen technologies to eliminate those, which have severe limitations for a given set of waste and site-specific conditions. The screening may eliminate technologies based on inherent technology limitations.

Site, waste, and technology characteristics, which are used to screen inapplicable technologies, are described in more detail below:

1. Site Characteristics

Site data shall be reviewed to identify conditions that may limit or promote the use of certain technologies. Technologies whose use is clearly precluded by site characteristics shall be eliminated from further consideration.

2. Waste Characteristics

Identification of waste characteristics that limit the effectiveness or feasibility of technologies is an important part of the screening process. Technologies clearly limited by these waste characteristics shall be eliminated from consideration. Waste characteristics particularly affect the feasibility of in-situ methods, direct treatment methods, and land disposal (on/off-site).

3. Technology Limitations

During the screening process, the level of technology development, performance record, and inherent construction, operation, and maintenance problems shall be identified for each technology considered. Technologies that are unreliable, perform poorly, or are not fully demonstrated may be eliminated in the screening process. For example, certain treatment methods have been developed to a point where they can be implemented in the field without extensive technology transfer or development.

D. Identification of Corrective Measure Alternatives

The Permittee shall develop the corrective measure alternatives based on the corrective action objectives. The Permittee shall rely on sound scientific judgment to determine which technologies appear most suitable for the site. Technologies can be combined to form the overall corrective action alternatives. The alternatives developed should represent a workable number of options that adequately address all site problems and corrective action objectives. Each alternative may consist of an individual technology or a combination of technologies. The Permittee shall document the reasons for excluding any technologies.

TASK II: EVALUATION OF THE CORRECTIVE MEASURE ALTERNATIVES

The Permittee shall describe each corrective measure alternative that passes the screening in Task I and evaluate each corrective measure alternative and its components. The evaluation shall be based on technical, environmental, human health and institutional concerns. The Permittee shall also develop cost estimates of each corrective measure.

A. Technical/Environmental/Human Health/Institutional

For each corrective measure alternative, the Permittee shall provide a description, which includes but is not limited to the following: preliminary process flow sheets, preliminary sizing and type of construction for buildings and structures, and rough quantities of utilities required. The Permittee shall evaluate each alternative in four areas.

1. Technical - The Permittee shall evaluate each corrective measure alternative based on performance, reliability, implementation, and safety.
 - a. The Permittee shall evaluate performance based on the effectiveness and useful life of the corrective measure:

- i) Effectiveness shall be evaluated in terms of the ability to perform intended functions, such as containment, diversion, removal, destruction, or treatment. The effectiveness of each corrective measure shall be determined through design specifications and by performance evaluation. Any specific waste or site characteristics, which could potentially impede effectiveness, shall be considered. The evaluation shall also consider the effectiveness of combinations of technologies; and
 - ii) Useful life is defined as the length of time the level of effectiveness can be maintained. Most corrective measure technologies with the exception of destruction, deteriorate with time. Deterioration can often be slowed through proper system operation and maintenance, but the technology may eventually require replacement. Each corrective measure shall be evaluated in terms of the projected service lives of its component technologies.
- b. The Permittee shall provide information on the reliability of each corrective measure including its operations and maintenance requirements and its demonstrated reliability:
 - i) Operations and maintenance requirements include the frequency and complexity of necessary operation and maintenance. Technologies requiring frequent or complex operation and maintenance activities shall be regarded as less reliable than technologies requiring little or straightforward operation and maintenance. The availability of labor and materials to meet these requirements shall also be considered; and
 - ii) Demonstrated and expected reliability measures are ways of measuring the risk and effect of failure. The Permittee shall evaluate whether the technologies have been used effectively under analogous conditions; whether the combination of technologies have been used together effectively; whether failure of any one technology has an immediate impact on receptors; and whether the corrective measure has the flexibility to deal with uncontrollable changes at the site.
- c. The Permittee shall describe the implementation of each corrective measure including the relative ease of installation (construction) and the time required achieving a given level of response:
 - i) Constructibility is determined by conditions both internal and external to the Facility conditions and includes such items as location of underground utilities, depth of water table, heterogeneity of subsurface materials, and location of the Facility (i.e., remote location versus a congested urban area). The Permittee shall evaluate what measures can be taken to facilitate construction under these conditions. External factors which affect implementation include the need for special permits or agreements, equipment availability, and the location of suitable off-site treatment or disposal facilities; and

ii) The Permittee shall address the time it takes to implement a corrective measure and the time it takes to actually see beneficial results. Beneficial results are defined as the reduction of contaminants to some acceptable, pre-established level.

d. The Permittee shall evaluate each corrective measure alternative with regard to safety. The evaluation shall include threats to the safety of nearby communities and environments as well as those to workers during implementation. Factors to consider are fire, explosion, and exposure to hazardous substances.

2. Environmental

The Permittee shall perform an Environmental Assessment for each alternative. The Environmental Assessment shall focus on the Facility conditions and pathways of contamination addressed by each alternative. The Environmental Assessment for each alternative will include, at a minimum, an evaluation of the short- and long-term beneficial and adverse effects of the response alternative; any adverse effects on environmentally sensitive areas; and an analysis of measures to mitigate adverse effects.

3. Human Health

The Permittee shall assess each alternative in terms of the extent to which it mitigates short- and long-term potential exposure to any residual contamination and protects human health both during and after implementing the corrective measures. The assessment will describe the types and levels of contaminants on-site, potential exposure routes, and potentially affected populations. Each alternative will be evaluated to determine the level of exposure to contaminants and the reduction over time. For management of mitigation measures, the relative reduction of impact will be determined by comparing residual levels of each alternative with existing criteria, standards, or guidelines acceptable to the Executive Secretary.

4. Institutional

The Permittee shall assess the effects of federal, state and local environmental and public health standards, regulations, guidance, advisories, ordinances, or community relations on the design, operations, and timing of each alternative.

B. Cost Estimate

The Permittee shall develop an estimate of the cost of each corrective measure alternative (and for each phase and segment of the alternative). The cost estimate shall include both capital and operation and maintenance costs.

a. Direct capital costs include:

1. Capital costs consist of direct (construction) and indirect (non-direct), and equipment required to install the corrective measure.
 - i) Construction costs: Cost of materials, labor (including fringe benefits and worker's compensation), and equipment required to install the corrective measure.
 - ii) Equipment costs: Costs of treatment, containment, disposal and/or service equipment necessary to implement the action; these materials remain until the corrective action is complete;
 - iii) Land and site-development costs: Expenses associated with purchase of land and development of existing property; and
 - iv) Buildings and services costs: Costs of process and non-process buildings, utility connections, purchased services, and disposal costs.

b. Indirect capital costs include:

- i) Engineering expenses: Costs of administration, design, construction supervision, drafting, and testing of corrective measure alternatives;
 - ii) Legal fees and license or permit costs: Administrative and technical costs necessary to obtain licenses and permits for installation and operation;
 - iii) Start-up and shakedown costs: Costs incurred during corrective measure start-up; and
 - iv) Contingency allowances: Funds to cover costs resulting from unforeseen circumstances, such as adverse weather conditions, strikes, and inadequate Facility characterization.
2. Operation and maintenance costs are post-construction costs necessary to ensure continued effectiveness of a corrective measure. The Permittee shall consider the following operation and maintenance cost components;
 - a. Operating labor costs: Wages, salaries, training, overhead, and fringe benefits associated with the labor needed for post-construction operations;
 - b. Maintenance materials and labor costs: Cost for labor, parts, and other resources required for routine maintenance of facilities and equipment;

- c. Auxiliary materials and energy: Costs of such items as chemicals and electricity for treatment plant operations, water and sewer service, and fuel;
- d. Purchased services: Sampling costs, laboratory fees, and professional fees for which the need can be predicted;
- e. Disposal and treatment costs: Costs of transporting, treating, and disposing of waste materials, such as treatment plant residues, generated during operations;
- f. Administrative costs: Costs associated with administration of corrective measure operation and maintenance not included under other categories;
- g. Other costs: Items that do not fit any of the above categories.

TASK III. RECOMMENDATION OF A CORRECTIVE MEASURE OR MEASURES

The Permittee shall justify and recommend a corrective measure alternative using technical, human health, and environmental criteria. The Permittee shall submit summary tables of the corrective measure alternative recommendations. Tradeoffs among health risks, environmental effects, and other pertinent factors shall be highlighted. The Executive Secretary shall approve the corrective measure alternative or alternatives to be implemented based on the results of Tasks II and III. The following criteria will be used to select the final corrective measure or measures.

A. Technical

- 1. Performance - corrective measure or measures which are most effective at performing their intended functions and maintaining performance over extended periods of time;
- 2. Reliability - corrective measure or measures which do not require frequent or complex operation and maintenance activities and that have proven effective under waste and Facility conditions similar to those anticipated;
- 3. Implementation - corrective measure or measures which can be constructed and operating to reduce levels of contamination to attain or exceed applicable standards in the shortest period of time; and
- 4. Safety - corrective measure or measures which pose the least threat to the safety of nearby residents and environments as well as workers during implementation.

B. Human Health

The corrective measure or measures must comply with existing federal and state criteria, standards, or guidelines for the protection of human health. Corrective measures, which provide the minimum level of exposure to contaminants and the maximum reduction in exposure with time, are preferred.

C. Environmental

The corrective measure or measures posing the least adverse impact (or greatest improvement) over the shortest period of time on the environment will be favored. The corrective measure(s) will be assessed as to the degree to which it employs treatment that reduces toxicity, mobility or volume of hazardous wastes and/or hazardous waste constituent(s).

TASK IV **CORRECTIVE MEASURES IMPLEMENTATION**

The purpose of the Corrective Measure Implementation program is to design, construct, operate, maintain, and monitor the performance of the corrective measure or measures selected to protect human health and the environment.

A. Corrective Measure Implementation Program Plan

The Permittee shall prepare a Corrective Measure Implementation Program Plan. This program will include the development and implementation of several plans, which require concurrent preparation. It may be necessary to revise plans as the work is performed to focus efforts on a particular problem. The Permittee shall furnish all personnel, materials and services necessary for the implementation of the corrective measure(s).

1. The Permittee shall prepare a Program Management Plan, which will document the overall management strategy for performing the design, construction, operation, maintenance and monitoring of corrective measure(s). The plan shall document the responsibility and authority of all organizations and key personnel involved with the implementation. The Program Management Plan will also include a description of qualifications of key personnel directing the Corrective Measures Implementation program, including contract personnel.
2. The Permittee shall revise the Community Relations Plan, performed as part of the RCRA Facility Investigation workplan, to incorporate any changes addressing the community during the design and construction activities.

B. Corrective Measure(s) Design

The Permittee shall prepare final construction plans and specifications to implement the corrective measure(s) at the Facility as defined in the Corrective Measure Study. At a minimum, the following shall be included, but not be limited to:

1. Design strategy and basis.
 - a. Currently accepted environmental control measures, construction practices and techniques, and the constructability of the design.
 - b. Assumptions, detailed drawings (e.g., process flow diagrams, general arrangement, and any applicable piping and instrumentation diagrams), equipment and specifications, and material and energy balance (if applicable).
 - c. Discussion of the possible sources of error and potential operation and maintenance problems.

2. Operations and maintenance plan:
 - a. Normal and alternate operation and maintenance practices (e.g., tasks for operation, tasks for maintenance, prescribed treatment or operation conditions, and schedule identifying frequency).
 - b. Routine monitoring and laboratory testing (e.g., description of monitoring tasks, required laboratory tests and their interpretation, required Quality Assurance/Quality Control, and a schedule of monitoring frequency).
 - c. Equipment description (including equipment identification, installation, of monitoring components, maintenance procedures, and replacement schedule), and records and reporting (e.g., daily operating logs, laboratory records, records for operating costs, reporting emergencies, personnel and maintenance records, and required monthly and annual reports to be submitted to the Executive Secretary).
 - d. Alternate operating and maintenance procedures to prevent undue hazard due to system failure and analysis should a failure occur.
 - e. Safety plan during routine operation and safety tasks in the event of systems failure.
3. Cost estimate.
4. Project schedule (identifying timing for initiation and completion of all critical path tasks, dates for completion of the project, and major milestones).
5. Construction quality assurance objectives (including but not limited to the responsibility and authority, personnel qualifications, inspection activities, sampling requirements, and documentation).
6. Health and safety plan (the health and safety plan developed for the RCRA Facility Investigation shall be modified to address the activities to be performed to implement the corrective measure(s)).
7. Design phases:
 - a. Preliminary design, approximately 30% design completion. The Permittee shall have field verified the existing condition of the Facility. The technical design requirements of the project shall be at an adequate level of completion to enable a determination if the final design will provide an operable and usable corrective measure. Supporting data and documentation shall be provided with the design documents defining the functional aspects of the program. The Permittee shall include with the preliminary submission design calculations reflecting the same percentage of completion as the designs they support.

- b. Intermediate design, approximately 60% completion. The intermediate design shall include the Design Plans and Specifications, Operation and Maintenance Plan, Project Schedule, Quality Assurance Plan and Specifications for the Health and Safety Plan.
- c. Equipment start-up and operator training identifying the contractor requirements for providing appropriate service visits by experienced personnel to supervise the installation, adjustment, start-up and operation treatment systems, and training covering appropriate operational procedures once the start-up has been successfully accomplished.
- d. Additional studies to supplement the available technical corrective measure implementation data may be required. Upon written notification from the Executive Secretary, the Permittee shall provide sufficient sampling, testing and analysis to optimize the required treatment and/or disposal operations and systems. A final report of the testing shall include all data taken during the testing and a summary of the results of the studies.
- e. Submittal of the pre-final design, approximately 95 % completion. The pre-final design submittal shall include the Design Plans and Specifications, Operations and Maintenance Plan, Project Schedule, Quality Assurance Plan and Specifications for the Health and Safety Plan.
- f. Submittal of final design, approximately 100% completion. The final design submittal shall include the Final Design Plans and Specifications, the Final Operation and Maintenance Plan, Final Quality Assurance Plan, Final Project Schedule and Final Health and Safety Plan specifications.

C. Corrective Measure(s) Construction

Following the Executive Secretary approval of the final design, the Permittee shall develop and implement a construction quality assurance program to ensure, with a reasonable degree of certainty, that a completed corrective measure(s) meets or exceeds all design criteria, plans, and specifications. The construction quality assurance plan is a Facility-specific document, which must be submitted to the Executive Secretary for approval prior to the start of construction. At a minimum, the construction quality assurance plan shall include the elements, which are summarized below. Upon the Executive Secretary approval of the construction quality assurance plan, the Permittee shall construct and implement the corrective measures in accordance with the approved design, schedule, and the construction quality assurance plan. The Permittee shall also implement the elements of the approved operation and maintenance plan.

- 1. The responsibility and authority of all organizations and the qualifications of all personnel shall be described in the construction quality assurance plan.

2. The observations and tests that will be used to monitor the construction and/or installation of the components of the corrective measure(s) shall be summarized in the construction assurance plan. The plan shall include the scope and frequency of each type of inspection. Inspections shall verify compliance with all environmental requirements and include, but not be limited to, air quality and emissions monitoring records, waste disposal records, etc. The inspections shall also ensure compliance with all health and safety procedures.
 - a. A preconstruction inspection and meeting shall be held to discuss methods for documenting and reporting inspection data, reviewing the distribution and storage of documents and reports, reviewing work area safety, discussing appropriate modifications to the construction quality assurance plan, and conducting a site visit.
 - b. Upon preliminary project completion, the Permittee shall notify the Executive Secretary for the purposes of conducting a pre-final inspection of the entire site. The walk-through inspection is to determine whether the project is complete and consistent with the contract documents and the corrective measures as approved by the Executive Secretary. The Permittee shall certify that the equipment has performed to meet the purpose and intent of the specifications. Retesting shall be completed where deficiencies are revealed. This pre-final inspection report shall outline the outstanding construction items, actions required to resolve items, completion date(s) for these items, and the date of the final inspection.
 - c. Upon completion of all outstanding construction items, the Permittee shall notify the Executive Secretary, by certified mail, express mail, or hand delivery, for the purposes of conducting a final inspection, the final inspection will focus on confirming that outstanding items have been resolved.

D. Sampling Requirements

The sampling activities, sample size, sample locations, frequency of testing, acceptance and rejection criteria, and plans for correcting problems shall be presented in the construction quality assurance plan.

E. Documentation

Reporting requirements for construction quality assurance activities shall be described in detail in the construction quality assurance plan. This shall include such items as daily summary reports, inspection and corrective measure reports, and design acceptance reports.

TASK V. REPORTS

A. Corrective Measures Study Reports

The Permittee shall prepare Corrective Measures Study reports in accordance with the schedule specified in Tables 4 and 5 of this Module.

B. Progress Reports

The progress reports shall contain the following information, at a minimum:

1. A description and estimate of the percentage of the Corrective Measures Study completed;
2. Summaries of all findings;
3. Summaries of all changes made in the Corrective measures Study during the reporting period;
4. Summaries of all contacts with representative of the local community, public interest groups or State government during the reporting period;
5. Summaries of all problems or potential problems encountered during the reporting period;
6. Actions being taken to rectify problems;
7. Changes in personnel during reporting period;
8. Projected work for the next reporting period; and
9. Copies of daily reports, inspection reports, laboratory/monitoring data, etc.

C. Corrective Measure Construction Reports

At the completion of construction, the Permittee shall submit a Corrective Measure Construction report to the Executive Secretary. The report shall establish that the project was built according to the specifications and that the corrective measure is performing adequately. The report shall include, but not limited to, the following elements:

1. Certification of the design and construction;
2. Explanation of any modifications to the plans and why these were necessary;
3. Listing of the criteria established for judging the functioning of the corrective measure and also explaining any modification to these criteria;
4. Results of Facility monitoring, indicating that the corrective measure will meet or exceed the performance criteria; and

5. Explanation of the operation and maintenance (including monitoring) to be undertaken at the Facility.

This report shall include all of the daily inspection summary reports, inspection summary reports, inspection data sheets, problem identification and corrective measure reports, block evaluation reports, photographic reporting data sheets, design engineers' acceptance reports, deviations from design and material specifications and as-built drawings.